CAPITAL REPLACEMENT IN NAVAL SHIPYARDS: A STUDY OF CURRENT CONDITIONS AND PROCEDURES WITH PROPOSALS FOR IMPROVEMENT

by

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CHAPTER 1

INTRODUCTION

Background

The naval shipyards are complex industrial organizations operated by the Naval Ship Systems Command in support of the fleet. They are sited in widely separated installations, employing approximately 90,000 civilian specialists comprising over 100 different trades and almost every technical discipline.

Naval shipyards have been with us almost as long as the Navy Department. In 1798, the year the Navy Department was established, the first Secretary ordered surveys of possible sites for government shipyards. Six yards were authorized in 1799, one to build each of six seventy-four-gun ships-of-the-line. Sites were purchased during the next two years at key points along the coast of the new nation - at Portsmouth, New Hampshire, at Boston, Brooklyn, Philadelphia, Washington, D.C., and Norfolk.

The yards were constantly changing, adjusting to meet the needs of the fleet. Some, like the Washington Navy Yard, cease functioning as a shipyard when they are no longer needed. New yards are created to meet new needs, as at Charleston, on the West Coast, and in Hawaii. Today, the New York Shipyard has been closed, and Portsmouth is being phased out over a ten

year period. Two shipyards on the West Coast merged and, after a few years, were separated again. All of this adjusting has left a total of nine "permanent" shipyards - four on the East Coast (Charleston, Norfolk, Philadelphia, and Boston), four on the West Coast (Puget Sound, Long Beach, Hunters Point and Mare Island), and one in Hawaii (Pearl Harbor).

The Naval shipyards have survived many a challenge to their existence. Indeed there are strong forces who are of the opinion that our nation cannot afford naval shipyards and would be better off without them. Several years ago, Edwin M. Hood, President of the Shipbuilders Council of America, said:

> I refer to the stifling competition the private shipyard industry has day in and day out, year in and year out, from the eleven naval shipyards and one naval ship repair facility.[1]
>
> By owning and operating these shipyards which duplicate all that the commercial yards can do, the Federal Government is, in fact, slowly suffocating the Private Shipyard Industry of the United States. No other major industry in this great nation is plaqued by such insidious destruction under government auspices.[2]

Variations of these charges against the naval shipyard complex appear in speeches, in the press, and in Congressional reports. Branded as "high cost" and "tax free," the naval shipyards are pictured as a government institution

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[1]The Navy now has nine shipyards and no ship repair facility in the U.S. It is difficult to tell how much influence President Hood's campaign had on the closing of the other activities.

[2]J. J. Meyer, Jr., "Our Nation's Shipyards," U. S. Naval Institute Proceedings (November, 1964), pp. 34-45.

operated to compete with, and flourish at the expense of, the "low cost," "tax paying" private yards. Accused of driving the private shipyards out of business, the Navy is charged with the simultaneous destruction of the mobilization potential of such yards.

The foundation of the private shipyard's case against the Navy is that through the free enterprise system the nation will be able to achieve greater economic effectiveness and a better defense capability at lower cost. In short, by eliminating what they consider the "unfair competition" represented by the naval shipyards, more work will be placed with the private yards, thus improving our economic system and strengthening the responsiveness of the fleet.

The Navy's argument centers on the principle of military responsiveness. Fundamental to the Navy's justification for a strong in-house shipyard capability is the military requirement that logistic support must be responsive to the operating forces.[1] Fleet operations, fleet maintenance, and fleet base support are basic to naval strength. Since 1801, the Navy has viewed its shipyards as an integral part of our nation's naval strength afloat.

By statute, the Navy is responsible for the construction, armament, equipment, and deployment of ships of war. The Navy relies upon naval shipyards for a large portion of

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[1]Operating forces consist of the Fleet Commanders, Type Commanders, and the individual active fleet ships.

the logistic support to fulfill this statutory responsibility. The mission of the naval shipyards as defined in law and Navy Regulations is a single-minded one, to serve the fleet. Private yards have no stated public mission. Despite the fact that they enjoy what amounts to a public subsidy based on broad considerations of national interest, their purpose is primarily to make profits for their private owners.

Perhaps the most significant difference of all between the two types of shipyards is in the range of services performed. The naval shipyard, whose mission it is to serve the fleet, is not only equipped to perform every conceivable type of repair service, but also all fleet support services necessary to maintain a ship and its crew. Industrial facilities and skills are available to service all the complex, and sometimes classified, weapons systems and machinery components of advanced design. There are few repairs which their shops cannot handle.

Besides this, the naval shipyard provides a full range of personnel and logistic services - barracks and dining halls, classroom and recreation facilities, hand tools and work spaces, offices and storage cages, tugs and cranes, supply department and ship's store, dispensary and dental clinic, technical library and blueprint files, photo laboratory, fuel depot, and chapel. These are supplemented by other facilities which, under separate command, customarily occupy space on the yard as tenant activities. All exist to provide service to the ships and their crews.

Few, if any, such "fringe benefits" are offered by private shipyards. Often the low bidder is many miles from the home port of the ship or from any Navy facilities. The crew may have to live on board even when work is in progress or the Navy may have to furnish its own berthing barge to give the ship's personnel a place to live and work. In the case of a new ship, it is customary to have the fitting out and final loading of store and equipment completed at a Navy yard because few contractors are equipped to accomplish this phase of the work. There is also the checking out and calibration of delicate electronics gear, requiring special test ranges and instrumentation available only at naval installations.

Another area of concern is related to the very basic question of cost. In 1962, the Shipbuilders Council of America lobbied through Congress a bill requiring the Navy to spend in private shipyards at least 35 per cent of the funds made available for ship repair, alterations, and conversions. This prompted the Navy to hire a consulting firm to analyze the costs of the private and naval shipyards. This action was reported in the newspapers as follows:

> . . . The Navy, apparently, wanted to hog more of this work for its own shipyards.
>
> So the Navy spent $197,000 of the taxpayer money to hire a consulting firm to analyze the costs, apparently in the hope it would show Navy costs were lower. The consulting firm's report said private shipyards were cheaper. So the Navy made the report "unavailable." But the nosy reporter got a copy and printed a story about it.[1]

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[1]"Ships, Reports, and Tax Dollars," Washington Daily News, June 20, 1963, p. 4.

The private shipbuilders also conducted a study and the same reporter printed his conclusion that this study also said private shipyards were cheaper. The private shipyards make the point that, based on unbiased cost studies by two reputable accounting firms, it has been proven that costs in naval shipyards are much higher than in private shipyards. The supporters of the private shipyards erroneously imply that these higher costs are applicable to all shipyard work, including the repair and overhaul of warships.

The first study to be produced was undertaken for the private shipbuilders by the accounting firm of Ernst and Ernst. A representative of the firm stated to a Congressional Committee that they were unable to break out the cost that could be identified as new construction versus repair, alteration, and conversion.[1] The President of the Shipbuilders Council, in referring to the report, said that:

> . . . Experts, on the basis of exhaustive investigations, agree that private yards can build, repair, alter, and convert ships at a cost of 20 per cent to 28 per cent below the cost of having the work done in . . . naval shipyards.[2]

The second and by far most comprehensive study was performed by Arthur Andersen and Company.[3] This report reached the following general conclusions concerning costs:

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[1]U.S. Naval Institute Proceedings (November, 1964), p. 41.

[2]Ibid., p. 41.

[3]Arthur Andersen and Company, Report on Survey and Analysis of Difference Between U.S. Navy Shipbuilding Costs at Naval and Private Shipyards, Report to Bureau of Ships, Department of the Navy, November 30, 1962.

1. That certain private yards could perform new construction work at less cost than naval shipyards.
2. Costs for conversion, repair and alteration are roughly equal.
3. Higher overhead costs of the naval shipyards are attributable to higher fringe benefits and more direct salary or wage personnel per non-supervisory hourly worker in production shops.

The Andersen report admits great difficulty in developing samples of comparable work. Many naval shipyard experts have taken issue with the conclusions of the Andersen report because of some of the methods used in the area of comparability. Specifically, they discredited the way in which depreciation allowance, Federal income tax, and interest on invested capital were computed and compared.

In a speech before the Senate, Senator Daniel Inouye, of Hawaii, recognized the disparity in these particular areas and concluded:[1]

> While it is difficult to establish a valid base for recomputing all of the adjustments which have been contested, we consider it fair and reasonable to reduce depreciation charges to 27 per cent of the amount used in the Andersen report and to eliminate the interest on invested capital . . .
>
> . . . As repeatedly emphasized in the Andersen report, the fringe benefits paid by naval shipyards constitute a significantly large overhead burden. Such benefits as annual leave, sick leave, holidays, jury duty and military leave boost naval shipyard costs, based on overall averages, to $1.29 per direct labor hour as compared to $0.84 for private shipyards; a big difference of $0.45 per direct labor hour. For new construction work the difference is $0.57 per hour, which, in the construction of a Polaris submarine, penalizes naval shipyards by over $3 million.

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[1] Congressional Record - Senate, October 3, 1963, pp. 17758-17759.

If we again make an adjustment for fringe benefits to reflect a truer and more accurate statistical picture by combining this fringe benefit adjustment with the adjustments for depreciation and interest on invested capital, naval experts find that the cost advantage of private shipyards have been pared as follows:

1. For the 598 class of nuclear attack submarines from 15.2 to 4.5 per cent.
2. For the 598 class of Polaris submarines from 20.3 to 10.8 per cent.
3. For the DLG-9 Coontz class guided-missile frigate from 18.7 to 8.2 per cent.
4. And for the CVA-59 class of supercarrier from 29 to 17.2 per cent.

Although certain statistical adjustments, as mentioned above, tend to reduce the cost differential between naval and private shipyards, the fact is that on a straight dollar-for-dollar basis, the naval shipyard is not usually competitive with private yards in new construction of naval ships. This point is not contested by the Navy and is not really the issue. Indeed, this is one of the main reasons that over 80 per cent of the Navy's ships are built in private yards. As a matter of fact, only three of the naval shipyards are designated as new construction yards and only approximately 50 per cent of their work is devoted to new construction. The rest is for conversion, alteration, and repair. No one naval shipyard is a totally new construction shipyard such as in private industry.

There is an overwhelming tendency among the private yards to use these statistics to support a contention that private industry can do the entire job of the naval shipyard cheaper. Neither Ernst and Ernst nor the Andersen report support this view.

Cost effectiveness is indeed an important consideration, but it is not the only one by which military effectiveness must be measured. It is unfortunate for the naval shipyards that their disadvantages are readily summarized in terms of gross cost, whereas their advantages are not easily translated into dollars and cents.

In view of the fact that complaints have been lodged against naval shipyards since their beginning and they still manage to retain a vital position in our nation's defense structure, it is assumed that their continued existence is relatively secure. This paper does not attempt to justify the existence of naval shipyards but to study some measures for improving their performance. It was felt necessary, however, to mention some of the arguments for and against naval shipyards.

Purpose of the Study

This subject has been of particular concern and interest to the author since serving as the Supply Officer of a ship undergoing an extensive overhaul at one of the naval shipyards. Interest and concern were heightened during a later tour of duty as Material Officer at one of the Navy's Ship Repair Facilities.

It can be argued that failure to maintain an effective level of equipment capability, including technological advances as well as routine preventive maintenance, will contribute significantly to the lack of optimum efficiency and economy. There are restrictions now placed on the naval shipyards in

regard to acquisition and replacement of capital assets which could retard the attainment of the proper level of equipment capability. The purpose of this thesis is to analyze the current physical condition of the United States naval shipyards' plant and equipment with an eye toward improvements in that condition through a realistic and more flexible capital replacement procedure.

Scope of the Study

This paper deals specifically with one aspect of an industrial type installation. That installation is the naval shipyard and the particular aspect is replacement of capital equipment. This involves a discussion of the way in which shipyards are funded for their operations and the current procedures for capital replacement.

Naval Ship Systems Command is currently conducting a large-scale, comprehensive shipyard modernization program. This program involves all nine shipyards and will attempt to reduce the unit cost, balance the industrial capacity, and provide capabilities required by changing technology.[1] The specific aim of this paper is to analyze methods which can be used to help shipyards maintain a current state-of-the-art when that position has been achieved through the modernization program.

Although this paper deals specifically with naval shipyards, there is no reason to believe the concepts would

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[1]W. N. Ginn, "New Approach Developed to Modernize Naval Shipyards," Navy Management Review (July, 1968), p. 12.

not be applicable in other activities utilizing the industrial fund method.

Chapter Two discusses the very urgent problem of shipyard modernization. Naval shipyards generally have reached the stage where obsolescence looms as a very real threat to the fulfillment of their fleet logistic support mission. Existing facilities lack much required modern equipment and adequate space layout in which to properly utilize it. An ambitious modernization program has been undertaken by the Naval Ship Systems Command, but it will take many years and much money to accomplish its purpose.

One of the most important innovations in the method of financing and operations in naval shipyards was the installation of the Navy Industrial Fund concept. The introduction of this system lifted the naval shipyards out of the dark ages of financial and management information. Benefits derived through increased economy and efficiency of operations have been impressive. In Chapter Three, the Navy Industrial Fund is explained. Pertinent legislative authority is cited along with some recent changes, and recommendations for further changes are made.

Chapter Four is concerned with methods of acquiring adequate funds for replacement of capital assets, when needed. The procedure which is currently employed is examined and some of the more prominent deficiencies are discussed. The Navy Industrial Fund as it now exists does not allow for depreciation of equipment as an element of cost. Depreciation,

along with some other costs, is recorded statistically, but the industrial fund is never reimbursed for these costs. Various investigative bodies have recommended that these costs be included in charges to customers, but the Department of Defense has not seen fit to introduce such a procedure. Accumulation of funds for replacement of equipment is discussed.

Control over capital expenditures is another cause for concern. Accumulation of a reserve for replacement does not necessarily imply that the shipyard commander can utilize those resources in any manner suitable to him. This aspect is also discussed in Chapter Four.

The method and base for depreciation is worthy of some comment and is touched upon in Chapter Four. Related to this discussion, of course, is the application of a suitable and appropriate index to determine the current value of the dollar.

Finally, some parallels are drawn with an industrial activity which utilizes funds collected through depreciation charges to keep technologically up-to-date. Economic advantages of maintaining a current state-of-the-art are demonstrated.

CHAPTER 2

MODERNIZATION A MUST

The current condition of the United States Naval Shipyards does not easily reflect the strong sentiments which have been expressed in their favor. If these "inseparable parts of our operating forces" are to remain effective in fulfilling their mission of serving the fleet, it is obvious that some heed must be taken of their physical state. Many people, for a number of years, have been interested in the modernity of the naval shipyards, not the least of these being the Congress of the United States, the Department of Defense, and the Naval Ship Systems Command.

During this period of time many investigations have been conducted and have pointed up the deficiencies and the major problem areas in the shipyards. One of the first problems is one of age. Naval shipyards range in age from about 165 years to one that is twenty-five years old. They are, in most instances, in World War I facilities, using World War II machinery and working on 1968 ships.

In March, 1966, the Naval Ship Systems Command awarded a contract to Kaiser Engineers and its associated firms to produce a long range modernization program for the naval shipyards. Naval Ship Systems Command set forth the following goals to be achieved in a modernization program:

1. Convert the complex from a "job shop" to a selective "process type" industry.
2. Develop a master industrial plan for each shipyard and for the total complex.
3. Determine optimum level of substituting capital for labor.
4. Reduce labor content of each job through the application of advanced technology and modern facilities and equipment.
5. Reduce cost and turn around time.[1]

The Kaiser Engineers' report was published in 1968, and revealed some alarming facts.[2] The major areas considered were categorized as follows:

1. Waterfront facilities.
2. Production equipment systems.
3. Electronics - Weapons - Precision systems.
4. Support systems.

Certain deficiencies were found to be common to each of these four major areas. These include over-age and obsolescent facilities and equipment, inadequate capacity to meet the projected workload, and lack of capability to meet specific workload requirements.

Some major deficiencies of the entire Naval Shipyard Complex are presented through discussion of the four major areas mentioned above.

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[1]U.S., Congress, House, Subcommittee of the Committee on Appropriations, Hearings, Military Construction Appropriations for 1969, 90th Cong., 2d Sess. (Washington, D.C.: Government Printing Office, 1968), p. 551, (hereafter referred to as Military Construction Hearings, 1969).

[2]Kaiser Engineers, Oakland, California, Engineered Long Range Modernization Program for the U.S. Naval Shipyards, Report to Naval Ship Systems Command, Department of the Navy, March, 1968.

Waterfront Facilities

The first two drydocks constructed in this country were completed in 1833, at the Boston Navy Yard and Gosport (now Norfolk) Navy Yard, and are still in operation. Over the next 100 years, the Navy's graving docks increased in number to twenty-seven, and during World War II the number increased to fifty-six. Two more have been constructed since World War II.

Recent advances in ship and ship systems' design have created serious deficiencies in the naval shipyards' existing docking facilities. The effect on the required drydock depth imposed by sonar dome projection and nuclear submarine development has rendered many drydocks obsolete. During World War II, the Navy had forty graving docks and seventy-one floating docks which could accommodate the destroyers and submarines of that period. The Navy now has only sixteen graving docks for modern destroyers and submarines and nine floating docks for deep draft submarines. Destroyer escorts, with a ten foot projecting dome, are now docked on keel blocking twelve feet high and require what used to be identified as a cruiser drydock. Whereas twenty feet of water sufficed for World War II submarines, Polaris submarines now require thirty-seven feet of water over the drydock floor.

Repair berthing facilities suffer from structural deficiencies which are generally the result of insufficient funding since World War II to maintain adequately and accommodate high density utilization of over-age pier structures.

They also have deficiencies which are due to the increasing requirements imposed by modern ship technology.

Production Equipment Systems

The production equipment systems of the naval shipyard complex are comprised of more than twelve thousand pieces of major production equipment, representing an original investment of about $130 million. It ranges in complexity from conventional machine tools to sophisticated numerically controlled equipment. However, a significant feature of these equipment systems is that more than one-half of the presently used equipment was acquired prior to 1944. Only about 3 per cent has been procured since 1960, and the average age is approaching a quarter of a century.[1] The retention of a viable and responsive fleet support capability will not be achieved without a substantial upgrading in production equipment systems. Kaiser Engineers envisions corrections to the following general deficiencies in production equipment systems which are common to all shipyards:

> Existing production equipment is generally overabundant, obsolete, and uneconomical, having been procured hastily in large numbers during wartime crises.
>
> Many production facilities are comprised of inadequate, sub-standard, outdated and uneconomical structures which were not designed for the functions they now house.
>
> Existing production flow is handicapped by unsuitable building configurations, random location of shops, duplication of material inventories,

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[1] Ibid., p. II-21.

excessive material handling and inconvenient location of personnel support facilities.[1]

Electronics - Weapons - Precision Facilities

Deficiencies generally found in all shipyards include:

1. Inadequate space to perform tasks required by the projected workload.
2. Inappropriate building configuration, which makes good work flow and job sequencing unobtainable.
3. Dispersion of Electronics, Weapons, Precision functions into multiple location throughout the yard.
4. Inadequate environmental controls (temperature, vibration, humidity, clean room, radiation, security, ventilation).
5. A lack of weight handling equipment for large antennas and other components.
6. Generally obsolete electronics support equipment that is inaccurate, overly complicated to operate and in poor condition due to excessive handling.
7. A lack of specialized test equipment.[2]

Support Systems

The naval shipyard support systems include the following:

1. Utilities and services.
2. Facilities for such support functions as Engineering and Management, Quality and Reliability Assurance; and support facilities such as waterfront crane systems and supply, storage, parking, and laydown facilities.
3. Shipyard structures.

The support systems are the most neglected areas of the Naval Shipyard Complex because urgently needed production

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[1] Ibid., p. II-22.

[2] Ibid., p. II-36.

capability expansion, dictated by advances in ship and weapons technology, has been accorded priority when funding approval has been sought.

Shipyard utilities are not only deficient with respect to capacity, but also the distribution systems are in such poor condition that extensive replacement and upgrading is required to maintain even the present levels of support.[1]

Few shipyard structures have been demolished since the various yards were established, and the average building age at a given yard is, therefore, to some extent a function of the date of the yard's commissioning. At Boston Naval Shipyard many of the buildings are over 100 years old and are of granite block construction with huge ceilings, difficult in every way to maintain. In contrast, the Long Beach buildings were largely constructed during World War II under the austere wartime construction policy.

The United States Naval Shipyard Complex has a capital investment of about $1.3 billion, its estimated replacement value is $3.2 billion, and it does an average annual business of $1.24 billion.[2] Naval shipyards constitute the largest and most complex job shop organization in existence. In most cases, the paucity of funds for naval shipyard equipment and facility improvement has been responsible for the existing deficiencies. The problem they face in the 1970's is, on the one

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[1] Ibid., p. II-44.

[2] Military Construction Hearings, op cit., p. 550.

hand, to support a composite Navy comprised of over-age ships equipped with modern electronics and weapons systems, and, on the other, to construct and maintain the expanding nuclear Navy.

The exhaustive study conducted by Kaiser Engineers determined that a total investment of $992 million over the next ten year period would be required to achieve a minimal level of modernization under the broad goals stated earlier.

A program value analysis of the modernization program[1] indicated that if the modernization program had been fully implemented in fiscal year 1967, and if the projected volume level for fiscal year 1972 had been accommodated in the modernized shipyards, naval shipyard operating costs, projected at $1.24 billion could have been lower by $103.4 million, a reduction of 8.3 per cent. Further, once the improved facilities are in place, an increase in work load of approximately 15 per cent can be accommodated with current shift configurations.[2] The distribution of the total $992 million investment and the direct economic benefits of $103.4 million among the nine shipyard sites is presented in Exhibit 2-1.

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[1]Booz-Allen and Hamilton, Washington, D.C., Program Value Analysis, Naval Shipyard Modernization Program, Report to Naval Ship Systems Command, Department of the Navy, May, 1968.

[2]The modernization program was based on the peacetime requirement of an eight-hour day, five-day a week basis. Facilities and equipment were engineered on this basis and, by use of more than one shift per day and overtime, projected workloads under cold and hot war scenarios could be accomplished.

INVESTMENTS AND ANNUAL BENEFITS BY FUNCTIONAL CATEGORY PROJECTED TO 1972 VOLUME (Dollars in Millions)

Naval Shipyard	Functional Categories	Waterfront Facilities	Industrial Production Facilities	Utilities	Support Facilities	Nuclear Facilities	Totals
Boston	Investments	$ 79.3	$ 56.3	$ 11.8	$ 44.2	-	$191.6
	Benefits	3.1	8.3	2.8	1.5	-	15.7
Philadelphia	Investments	4.3	49.5	16.9	33.8	-	104.5
	Benefits	1.7	3.7	3.2	1.4	-	10.0
Norfolk	Investments	28.4	28.7	14.2	28.5	2.8	102.6
	Benefits	4.1	3.5	3.1	2.5	.1	13.3
Charleston	Investments	22.1	33.3	9.0	15.2	3.7	83.3
	Benefits	3.1	3.6	1.8	1.0	.1	9.6
Puget Sound	Investments	2.2	37.2	10.0	24.0	9.1	82.5
	Benefits	.3	3.3	5.0	3.0	.1	11.7
Mare Island	Investments	17.1	40.1	10.2	48.0	10.8	126.2
	Benefits	1.5	3.6	2.4	3.7	.1	11.3
Hunters Point	Investments	8.6	38.8	9.8	28.4	-	85.6
	Benefits	1.0	3.7	3.0	2.9	-	10.6
Long Beach	Investments	48.9	49.5	11.0	25.2	-	134.6
	Benefits	1.4	3.5	2.5	1.7	-	9.1
Pearl Harbor	Investments	3.4	39.4	7.6	26.9	3.8	81.3
	Benefits	1.1	3.3	2.1	3.0	.1	9.6
Total	Investments	214.3	372.8	100.5	274.2	30.2	$992.0
	Benefits	17.3	36.5	25.9	20.7	.5	$100.9
	Benefit due to reduced risk						$ 2.5
	Total						$103.4

EXHIBIT 2-1

The above benefits are predicated upon sound management action in taking advantage of the potential savings made possible by the improved facilities. The modernization program includes $15 million for design and development of improved shipyard management information systems. The subject of shipyard management is beyond the scope of this paper but is of utmost importance in improving the overall efficiency and effectiveness of United States Naval Shipyards.

In summary, naval shipyards have reached a precipice. Dramatic action and great expense has been found necessary to prevent collapse with resulting disastrous consequences. The action is being taken and, in fact, the naval shipyards are being modernized. This is a long and costly process. One must, of necessity, reflect upon the causes that placed the naval shipyards in the condition in which they are now found and wonder if the same thing may not be true a quarter of a century hence unless some steps are taken now to prevent such an occurrence.

Chapter 3

WORKING CAPITAL FUND

"Working capital funds, sometimes called 'revolving' funds, are those funds established with a fixed amount of capital to take care of a manufacturing or service operation which is self-sustaining in nature."[1]

Before Working-Capital Funds

Prior to the middle of the century, the manufacturing and service operations of the Department of Defense operated on an appropriation structure whereby numerous appropriations were required to support an activity, and many Bureaus were involved in the financial responsibility. Because of the many appropriations granted to each activity or program, it became almost impossible to evaluate the performance or measure the results of the money spent. Where materials, supplies or services desired by one unit were to be secured from another unit the operation would be financed by annual Congressional appropriations to the supplying unit; the consuming unit would requisition the desired supplies or services from the producing unit but would not pay for them out of its

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[1]Lloyd Morey and Robert P. Hackett, Fundamentals of Governmental Accounting (New York: John Wiley and Sons, Inc., 1952), p. 184.

own appropriation. Supplies and services thus acquired were known as "free issues."

It was a difficult task for any Bureau to be able to furnish the exact cost of the complete operation of any one activity or program. Fiscal responsibility was diffused. Effective financial management was impossible.

For many years it had been recognized that a change in the appropriations structure was necessary. Today, numerous governmental supply activities have been established in revolving funds. The Department of Defense has the greatest number of revolving funds. The authorization for the use by the military of such funds was an outgrowth of the first Hoover Commission report.

Authorizing Legislation

> The Commission's work was based on the belief that there exists in the United States the kind of government and an economic system which will assure the continuation of political freedom and economic progress. This economic system is based on the fundamental concept of private industry - not state - owned and operated industry. The Department of Defense is engaged in many business enterprises. It is our belief that all such commercial and industrial activities that can be effectively performed by private industry should be turned over to private industry . . . Private industry should be able to meet effectively the diverse and fluctuating needs of the Government. Accordingly, Government operation of business-type activities to meet these needs is, in most cases, unnecessary.[1]

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[1]Commission on the Organization of the Executive Branch of the Government, Subcommittee Report on Business Enterprises of the Department of Defense (Washington: U.S. Government Printing Office, June, 1955), pp. 1-3.

The Commission's report was presented to Congress in January, 1949, and contained recommendations for promoting economy and efficiency in the National Military Establishment. On August 10, 1949, Congress passed Public Law 216, under which working capital funds were authorized by sections 405 (a), 405(b), 405(c), and 405(d) as follows:

(a) In order more effectively to control and account for the cost of programs and work performed in the Department of Defense, the Secretary of Defense is authorized to require the establishment of working-capital funds in the Department of Defense for the purpose of --

1. financing inventories of such stores, supplies, materials, and equipment as he may designate; and
2. providing working capital for such industrial-type activities, and for such commercial-type activities as provide common services within or among the departments and agencies of the Department of Defense, as he may designate.

(b) The Secretary of the Treasury is authorized and directed to establish on the books of the Treasury Department at the request of the Secretary of Defense the working-capital funds established pursuant to the authority of this section.

(c) Such funds shall be --

1. charged, when appropriate, with the cost of stores, supplies, materials, and equipment procured or otherwise acquired, manufactured, repaired, issued, and consumed and of services rendered or work performed, including applicable administrative expenses; and
2. reimbursed from available appropriations or otherwise credited for the cost of stores, supplies, materials, or equipment furnished and of services rendered or work performed, including applicable administrative expenses.

Reports of the condition and operations of such funds shall be made annually to the President and to the Congress.

(d) The Secretary of Defense is authorized to provide capital for such working-capital funds by capitalizing inventories on hand and, with the approval of the President, by transfer, until December 31, 1954, from unexpended balances of any appropriations of the military departments not carried to the surplus fund of the Treasury: provided, that no deficiency shall be incurred in any such appropriation as a result of any such transfer. To the extent that such methods do not, in the determination of the Secretary of Defense, provide adequate amounts of working capital, there is hereby authorized to be appropriated, out of any monies in the Treasury not appropriated for other purposes, such sums as may be necessary to provide adequate working capital.[1]

Advantages of Revolving Funds

There are, of course, a number of advantages in revolving funds. Eric Kohler lists the following:

1. The supplying unit does not finance its acquisitions by means of annual appropriations; its operations are responsive to and limited by projected sales.
2. Where a buying unit may at its option purchase from a supply unit or from an outsider if a better price or service is offered, the resulting competition should improve the efficiency of the buying operation and insure that its costs are kept to a minimum. Economical buying becomes a specialty rather than something incidental to a larger purpose.
3. The buying unit is freed from the burdens of contracting, stocking, and inventorying.
4. The buying unit must include in its requests for an appropriation amounts to cover purchases from the revolving fund.[2]

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[1]U.S., Congress, The National Security Act Amendment of 1949, Pub. L. 216, August 10, 1949.

[2]Eric L. Kohler and Howard W. Wright, Accounting in the Federal Government (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1956), p. 216.

Revolving or working-capital funds designate governmental structures, the revenues of which are employed without appropriation; they are, therefore, self-perpetuating. The working-capital fund for industrial-type activities in the United States Navy is called the Navy Industrial Fund. Within only a few years of the passage of the legislation mentioned earlier, all naval shipyards were included in the Navy Industrial Fund Program.

A Shipyard Industrial Fund

The initial working capital of a naval shipyard is provided by an allocation of funds from the cash balance (corpus) of the Navy Industrial Fund and by capitalization of existing inventories of material and supplies. The amount of employees accrued annual leave at the shipyard is established as a liability upon commencement of operations under the industrial fund. The net amount of this working capital is thereafter utilized by the shipyard as a revolving fund to finance the costs of producing goods and services ordered by customers of the shipyard. The industrial fund is reimbursed by billing the appropriations of the customer for the costs of goods and services furnished.

Customers place orders for manufacture, repair, alteration, and other services with the particular shipyard chosen to produce or render such services. After acceptance by the shipyard, the customer records the amount of the order as an obligation against appropriations available for the purpose in the same manner as when orders or contracts are

placed with private concerns. The liability of the customer is limited by the amount and terms of the order. Costs of the goods and services produced are billed to the customer. Accrued costs in excess of a project order do not constitute an over-obligation, provided that the project order is not billed in excess of the amount authorized. In this respect, the issuer of the project order must be contacted to renegotiate the project order amount. In the event renegotiation cannot be made, the project order is billed only for the authorized amount. The difference between the accrued costs and the amount billed is absorbed by the Navy Industrial Fund. These bills provide the basis for charging the appropriations and liquidating the obligations of the customer and at the same time reimbursing the working-capital of the shipyard.

An industrial fund activity bills the ordering agency for performance of work and services on the basis of costs incurred by that activity, or on the basis of fixed prices or predetermined rates established to recover such costs. Inasmuch as Industrial Fund activities are theoretically operated on a "zero" profit or loss basis, these activities are required to minimize gains and losses on individual orders through improved cost estimating and cost control.

Exhibit number 3-1 illustrates the cycle of operations under Navy Industrial Fund financing.

The revenues of the Navy Industrial Fund are obviously dependent upon operating volume and the pricing policy followed. Both are in turn dependent on the will of the

CYCLE OF OPERATIONS UNDER NAVY INDUSTRIAL FUND FINANCING

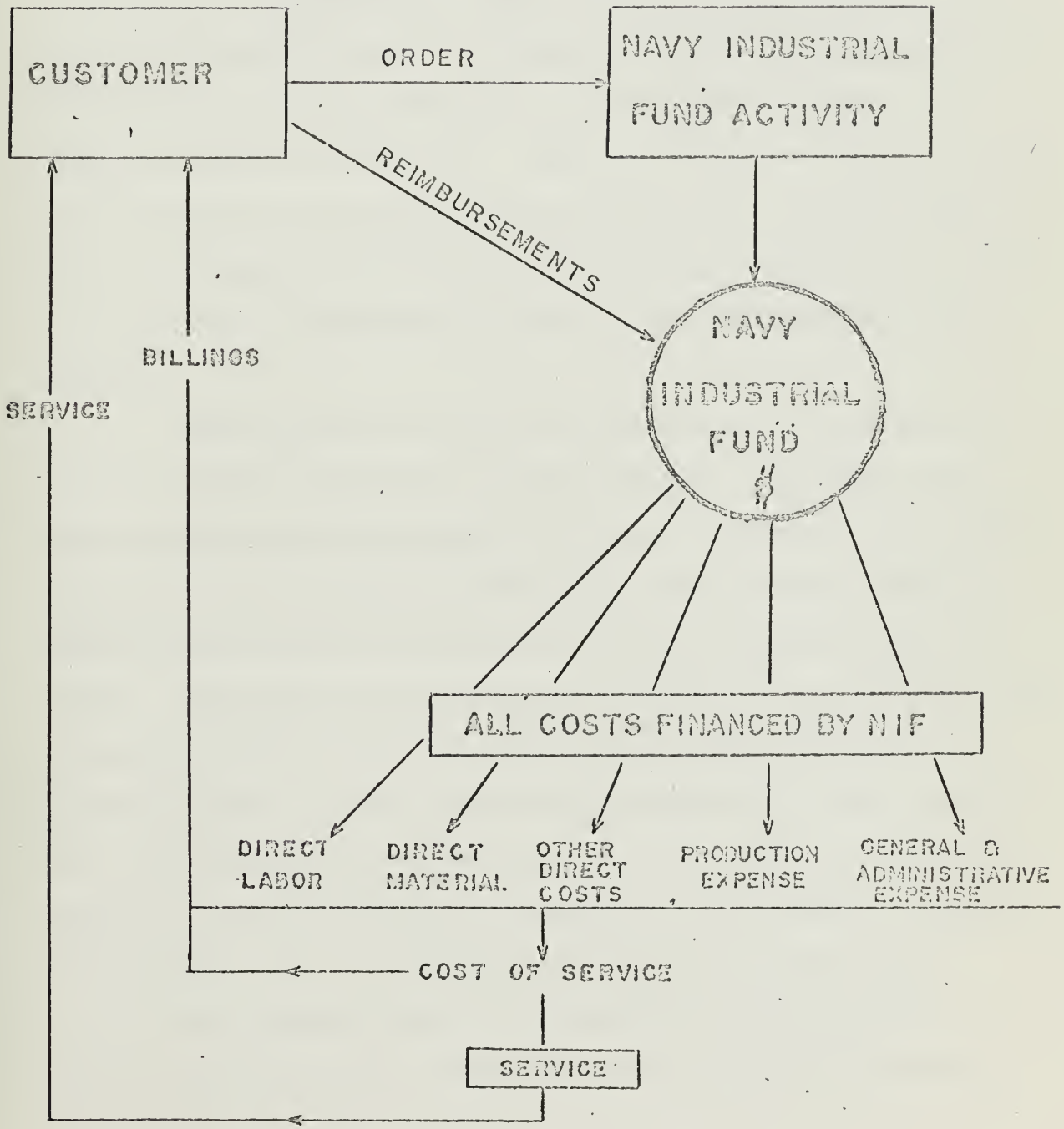

EXHIBIT 3-1

Congress, since appropriations to the customers of the fund must precede purchases.

Determination of Overhead Rate

Prices in naval shipyards are usually at cost and it is, therefore, necessary to identify the costs to be included in the price computation. This is particularly true with respect to various types of overhead. Overhead costs include all costs which are not capable of being directly charged to a specific product or service. This inability to identify costs to a specific order could stem from lack of a direct relationship, or because the cost of establishing an accounting system to measure the relationship would exceed the benefits to be derived.

These types of costs are accumulated in overhead expense accounts established by cost centers. Overhead costs, those associated with production as well as general and administrative, are applied to direct job orders on the basis of predetermined rates multiplied by direct labor hours per job order. The direct labor hours applicable to general and administrative overhead are the total direct labor hours of the production cost centers utilizing the services of the general and administrative cost centers of the shipyard. The application of overhead provides management with financial control of overhead costs in productive and service activities.

The overhead rates are calculated prior to each fiscal year and may be changed quarterly or more frequently

if necessary. Exhibit number 3-2 illustrates the concept of application of overhead at a naval shipyard.

Certain "statistical costs" are not included in the overhead when computing prices. The term "statistical costs" as used in accounting for industrial operations of Department of Defense revolving funds covers costs applicable to revolving fund operations but paid for by some other organizational unit. In this sense, statistical costs include depreciation of fixed assets.

Legislative Changes

Legislation authorizing the use of revolving funds in the Department of Defense did not initially permit the inclusion of depreciation as an expense in determining prices except those charged to non-Department of Defense customers.[1] Kohler surmised that Congress apparently wanted to approve specifically fixed asset acquisitions by reviewing proposals therefor, and was reluctant to permit the building up of cash resources in revolving funds through the inclusion of depreciation charges in prices, fearing the dissipation of cash resources on nonessential assets prior to the replacement of essential ones.[2]

Although the legislation did not initially permit the inclusion of depreciation as an expense in determining prices,

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[1]One of the rules of doing business for non-Department of Defense parties is that no loss shall be incurred.

[2]Kohler, op cit., p. 222.

APPLICATION OF OVERHEAD

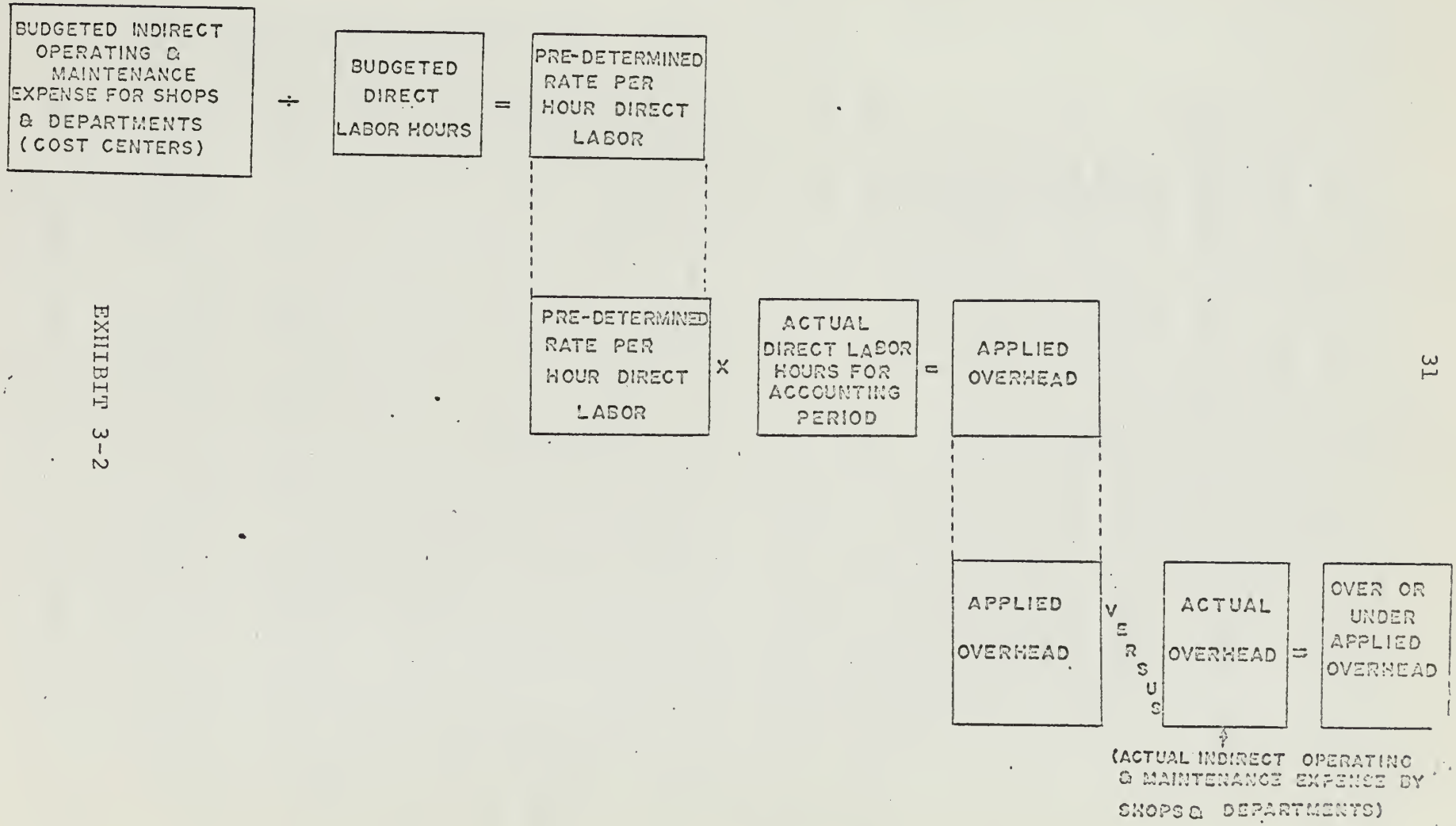

EXHIBIT 3-2

there has since been a codification of Title IV of the National Security Act into Title Ten of the United States Code wherein some of the wording was changed as follows:

> (c) Working-capital funds shall be charged, when appropriate, with the cost of --
>
> 1. supplies that are procured or otherwise acquired, manufactured, repaired, issued, or used; and
> 2. services or work performed; including applicable administrative expenses, and be reimbursed from available appropriations or otherwise credited for those costs, including applicable administrative expenses and costs of using equipment.[1] (underscoring added)

This information was received with a degree of enthusiasm in some Navy circles. An article appearing in a Navy publication shortly thereafter carried the following statement:

> In codifying section 405 on working-capital funds, the question of authorized charges was clarified by making an express provision for working-capital funds to be reimbursed for the 'cost of using equipment.'
>
> This legislation represents the most important development in industrial funding since the Congress created the authority for the working-capital funds in the Department of Defense, and it has obvious operating and financial management implications. The prices charged by industrially funded activities will be more representative of the costs of producing the products or rendering the services. The customers of these activities will then be in a better position to assess value received for total dollars expended. Since equipment replacement will be financed as an overhead expense, activity management can be expected to give even more consideration to their equipment replacement requirements and, from their view, assess value received, from improved productivity, for dollars expended.
>
> Concerning the implementation of this legislation, the first required step is a change in the Industrial Fund Regulations. In addition, it will be necessary to time-phase the implementation to allow for its

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[1]United States Code; Title 10; 2208(c), (1) and (2).

> effect on customer funding, and on the cost of work undertaken on the basis of fixed price agreements. Considering these and other details, it appears that this important change to industrial fund procedures cannot be implemented until Fiscal Year 1964, and then probably only on a partial basis.[1]

The Fiscal Year 1964 deadline was, perhaps, optimistic but the fact is that "the mechanics for charging this cost to customers' appropriations" have not yet been promulgated. This slight alteration of the legislation took more than ten years to effect and it appears to be an admission that some change in the industrial fund operation is required. Naval shipyards do not benefit fully from the advantages available in a working capital fund operation. They are not self-sustaining nor self-perpetuating in that they are dependent upon appropriated funds to improve or replace fixed assets. This will be discussed in the next chapter.

In this chapter we have looked briefly at the history and advantages of the Navy Industrial Fund Program. It is safe to say, I feel, that this concept is sound and completely justified in the activities in which it is being utilized. There is no question that many of the problems inherent in appropriation structure employed prior to the middle of the century have been solved by the working-capital fund concept. There is, however, room for improvement. The next chapter will deal with some suggestions for potential dynamic improvements.

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[1] Navy Comptroller Review (December, 1962), pp. 2-3.

CHAPTER 4

CAPITAL REPLACEMENT

> So far as we may judge from the territory surveyed by working parties and others, it is safe to say, with only slight risk of exaggeration, that Britain knew how to build great industries, but never learned how to rebuild them. At their inception, they were the last word in modernity and efficiency, a model to the world. But they became decrepit with age. What happened was a failure of re-equipment policy.[1]

This would appear to be quite an indictment on any industrial society. And yet evidence has been presented that would indicate that the United States Naval Shipyards are guilty of this same shortcoming. There are many reasons why such a situation could come to exist and the naval shipyards are not fully to blame, but the question that must now be faced is -- what can be done to prevent this great industry from once again becoming decrepit with age?

Current Replacement Procedure

In answering this question, it is necessary to examine the procedure which is currently being employed to replace capital equipment. This procedure generally follows the customary budgeting pattern. Capital equipment expenditures are proposed by the shipyard commanders. These proposals are made

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[1]Machinery and Allied Products Institute, Technological Stagnation in Great Britain, (Chicago, 1948), p. 63.

to the Naval Ship Systems Command many months in advance of the anticipated acquisition. Naval Ship Systems Command puts together a package for submission to the Department of the Navy making whatever adjustments are deemed necessary so that total equipment acquisitions are within the limit of funds established by the President's budget objective. These requirements are then subject to justification before various levels of the Department of Defense and the Bureau of the Budget. Capital equipment expenditures are contained in a separate sub-title of the budget.

After Congressional review, the appropriations are processed through Congress. The funds resulting from appropriation are then made available through channels to the shipyard. This is a very lengthy and time consuming process.[1] Not only must the shipyard commander make his requests known many months in advance, but he must live with the inevitable delays which seem to be inherent in our budgetary process. These unscheduled delays have a deleterious effect on workload forecast and on planning in general.

Maintenance Becomes the Only Alternative

When the requests are finally acted upon, the funding to shipyards in support of equipment requirements often differs

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[1]For the last few years, government activities have been operating on the prior year budget figures well into the current year's operations before new appropriations have been approved by Congress. The Fiscal Year 71 budget had already been sent to Congress before the Fiscal Year 70 budget was approved. Eight months of the Fiscal Year had elapsed before money was appropriated.

considerably from amounts requested. There are, perhaps, a number of reasons why this is usually the case. The procurement of a piece of production equipment does not carry the same priority nor "glamour" as do modern weapon systems or rocket launchers, and in the perennial give and take of the budget squeeze, the projects on the end of the priority list are the ones which are deferred or reduced almost to nothing. The bit and piece cutting has deteriotive effects in naval shipyards, in the fleet, and in many other areas. It becomes a one-sided competitive contest which has the end result of forcing continued maintenance of tools and equipment far beyond the point of economical repair. There have been many instances where average annual maintenance costs on plant equipment was as high as 70 per cent of replacement cost of the same equipment.[1] Costs for maintenance are funded through the Navy Industrial Fund as a part of overhead expense. In the absence of appropriated funds for acquisition of replacement equipment, the manager has little alternative but the uneconomical one of expending maintenance funds for equipment which has been determined beyond economical repair. The ready availability of one source of funds over another causes the manager to choose the alternative which is not the low cost alternative from the point of view of the Government as

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[1]Chief, Bureau of Ships letter, serial 704-301, August 3, 1959, Subject, "Funds to Replace Plant Equipment Beyond Economical Repair;" Chief, Bureau of Ships letter, serial 2751-400, July 21, 1959, Subject, "Costs of Minor Acquisitions and Improvements of Capital Property."

a whole. Of course, these types of decisions reach a limit where the only alternatives available are to stop production or purchase replacements. One is reminded of the statement of Professor Hatfield who said that "all machinery is on an irresistible march to the junk heap, and its progress, while it may be delayed, cannot be prevented by repairs."[1] Experience indicates that this statement has become painfully true with respect to naval shipyards (and, no doubt, with all other industrial activities -- government and non-government), and the problems created by this fact are becoming increasingly important. Aging has a twofold impact on equipment performance. First, the costs of operation are an increasing function of age; second, the rate of output decreases with equipment age. Consequently, the equipment's net benefits are a decreasing function of equipment age.

Funding Equipment Costs

One of the basic principles underlying the installation of the Navy Industrial Fund was to give increased flexibility of operation without the restrictions frequently forced on operations by appropriation accounting. The requirement for funding from a source other than the normal yard operations prevents shipyards frequently from achieving rather considerable economies. One Navy comptroller wrote:

> . . . the product of the plant includes nearly all costs including maintenance of buildings and equipment

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[1]H. R. Hatfield, Accounting (New York: D. Appleton and Company, 1931), p. 130.

> as well as major repairs. Therefore, decisions in the area of major maintenance are made by the Commanding Officer depending upon the effect they will have on operating costs at the time. He does not have to wait for funding authorization from higher echelons. Of course, he must abide by Bureau directives which require approval for major maintenance jobs but his operation will finance the cost in any event. It is easier to obtain an administrative decision than a funding authorization.[1]

Under the current procedures, it is difficult at best for shipyard commanders to plan and maintain modernization schedules for their facilities. Costly interrupted production caused by administrative delays in acquiring capital equipment when it is needed are difficult to avoid.

One answer to this dilemma can be found in the Cooper Committee Report.

> The Committee has already adopted a stand on the depreciation as applied to the military departments in general:
>
> 1. Depreciation accounting should not be employed with respect to (a) weapons and other military items, including ships, aircraft, and combat vehicles, and (b) fixed assets used in carrying out military missions or in the general administration of the Department, including buildings, equipment and other facilities, except as provided below.
> 2. Depreciation accounting should be employed with respect to (a) industrial and commercial activities, and (b) construction equipment and other facilities consumed in the process of construction, where depreciation charges constitute a significant element of cost. Depreciation accounting should be applied to the entire production plant, i.e., buildings, machinery and equipment in industrial and commercial activities. Moreover, depreciation charges should be used as a factor in determining the price of the product or services.

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[1]Commander James M. Brogan, "Navy Industrial Fund Operations at Naval Ordnance Plant, Forest Park, Illinois," Navy Comptroller Review, III (March, 1956), pp. 13-14.

> It would be advantageous for recoveries attributable to depreciation charges for machinery and equipment (but not for buildings) to be made available as a source of financing for the continuity of machinery and equipment, subject to appropriate safeguards such as approval by higher authority, and necessary legislative authority to this end should be sought. In the absence of such authority or inability to obtain it, such recoveries should be transferred to general receipts of the Treasury along with the recoveries related to depreciation of buildings.[1]

Another investigative body made a similar recommendation the next year.

> A problem involved is the determination of when to capitalize the costs of property and when to charge such costs against operations.
>
> Costs of capital assets used in industrial and commercial type installations should be depreciated over their useful lives and the resulting periodic depreciation charges included as an element of operating costs.[2]

The practice of including depreciation charges as an element of operating costs is not being employed in the naval shipyards. Depreciation costs are recorded statistically and are reflected for the installation as a whole rather than being alloted to particular jobs or programs. In the relatively insignificant[3] cases where shipyards include a factor for depreciation in billings to non-government customers, the amounts thus received are deposited in the Treasury as

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[1]Office of the Secretary of Defense, Report of the Industrial Activities Working Group of the Advisory Committee on Fiscal Organization and Procedures, 1954, pp. 33-34.

[2]Commission on Organization of the Executive Branch of the Government, Budget and Accounting Task Force Report, June 20, 1955, p. 41.

[3]Billings to non-government activities amount to less than 1 per cent of total revenue.

miscellaneous receipts and are no longer available to the Navy Industrial Fund. There have been a great many proposals in addition to those already cited for recording depreciation as a cost at industrial fund installations, and for funding equipment and other capital costs. Frederick Mosher said that "a full-fledged working capital fund necessitates the costing of virtually all resources utilized, including depreciation."[1] Arthur N. Lorig spoke out in favor of depreciation as an element of cost when he said:

> A working capital fund using its own depreciable assets to serve other departments and operating on a break-even basis must recover the cost of the assets over their useful lives. The charge for the services is set at the level necessary to cover the depreciation as well as other costs.[2]

Sanders, Hatfield, and Moore wrote many years ago about the multiple purposes of depreciation accounting:

> The main purpose of the accounting provision for depreciation is to allocate to the period a proper amount of operating expense. A further purpose is to maintain the capital investment intact . . . It cannot be too strongly urged that the maintenance of the original investment, by adequate charges against earnings, is the principal means by which the physical plant is kept in up-to-date operating condition.[3]

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[1]Frederick C. Mosher, Program Budgeting, Theory and Practice with Particular Reference to the United States Department of the Army (New York Public Administration Services, 1954), p. 245.

[2]Arthur N. Lorig, "Depreciation as a Source of Funds," The Federal Accountant, XVI (November, 1967), p. 54.

[3]Sanders, Hatfield, and Moore, A Statement of Accounting Principles (New York: American Institute of Accountants, 1938), pp. 31-32.

Upon analysis, the matter of funding of capital costs becomes a many-sided problem. These questions are suggested:

1. Should capital costs as and if funded include all land-use, building, and equipment costs or only some of them?
2. Should depreciation and use costs be applied to all assets, or only to recently acquired assets?
3. With respect to equipment, should all equipment costs be funded, or should there be some exclusions based upon such criteria as unit cost, useful life or degree of utilization?
4. If certain capital costs are to be funded and included as elements in bills rendered, what disposition is to be made of the proceeds?
5. If certain capital costs are to be funded, and the proceeds used to procure new equipment, should the authority for such procurement be exercised at a different point than it is now?

With respect to the first question, it is quite doubtful that there would be much of a chance for achieving full funding of land-use and building costs. The requirement for specific Congressional approval of public works projects, the fact that such costs are relatively sunk and the investment in land and buildings relatively fixed, and the fact that such huge items included in current billings and appropriations would have the rather uncertain effect of having the Government begin paying for these assets once more, all tend to minimize the practical possibilities for funding this element of cost.

With reference to capital equipment, it must be recognized that, if these costs are funded and depreciation reserves established, it does not necessarily follow that local management can automatically replace equipment by using such reserves. It is quite conceivable that charges for depreciation

may be authorized as a factor in bills rendered, and depreciation reserves established, without changing in any respect present practices for authorization of equipment procurement. This could be done in many ways: (a) amounts collected which represented depreciation costs could be transferred to Treasury miscellaneous receipts in the same way as is now being done for non-government customers. This would make depreciation a factor in all bills rendered while preserving the present locus of equipment procurement authority, but would overstate total defense costs since equipment procurement costs would come to appear in Defense appropriations twice; (b) by transferring amounts collected by reason of charges for depreciation to the Other Procurement Navy (OPN) appropriation and subjecting such amounts to the normal budgetary controls applicable to procurement accounts. This would have the advantage over the first alternative of at least transferring the funds to an account which can be utilized by other Navy activities. The OPN appropriation is currently utilized for procurement of capital equipment when such procurement is approved by Congress. There is no guarantee, however, that these funds will be available for use by shipyards when required. The shipyards, who were responsible for the collection of part of the funds through depreciation charges, would have to compete for those funds with all other activities vying for procurement appropriations; (c) by leaving the depreciation reserve with the installation, but subjecting equipment procurement there to budgetary limitations.

One advantage of the second alternative over the third is that depreciation reserves could then be used in areas where the Department's current equipment needs were the greatest, which would not necessarily be those places where the largest depreciation reserves accumulated. The advantage over the first alternative is that the funds would be available to the installation and not lost in miscellaneous accounts.

A combination of the second and third alternative would suggest an alternative which is similar to one that the Russian government has been said to practice.[1] That is that activities pay into a centrally controlled fund the amounts recovered as depreciation. When a need to acquire plant assets arises, that activity having the need has first call upon the cash it has paid into the fund, but unless that need develops, the money can be used to finance the acquisition of assets for other activities. This has the advantage of retaining the funds collected for the benefit of those activities collecting them while maintaining enough flexibility to transfer funds from one type of activity (shipyard) to an activity of the same type (another shipyard). If a sudden and unexpected need for plant assets arises, and the funds collected by that activity having the need are depleted, funds can then be diverted from one or more activities with less urgent requirements. These decisions would be better made at the Department of Defense level since those planners are in a better position to assess long range, future requirements and plans.

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[1]Lorig, op cit., p. 58.

The matter of funding equipment costs can be treated totally aside, however, from whether there should be a change in the locus of authority for equipment procurement. In general, proposals for funding equipment costs seem to spring from the premise that a more factual or "true" cost would result, or because it seems to be a business-like thing to do. If the reason for desiring true costs is that of management appraisal, depreciation and other unfunded costs could now be incorporated in all reports developed, and appended to all bills. Everyone could be informed of true costs without including depreciation in amounts charged for work performed. There is little evidence that such information would have much practical use. In the words of a former Assistant Secretary of Defense (Comptroller), Wilfred J. McNeil:

> . . . whenever depreciation is a cost factor in making such decisions as make or buy, or replacement of obsolete facilities, cost computations can be made on a statistical basis. These are one-time studies on a highly selective basis. Comprehensive, continuous, monthly depreciation accounting on all fixed assets is not required. Cost accounting should not be designed so elaborately as to meet a theoretical objective of providing every conceivable kind of specialized cost data infrequently required. We have to fight this mistaken view continuously, and the difficulties exist as much with people having a management interest as with accountants.[1]

While a "truer" cost might be a corollary of a charge for depreciation, that should not be the primary purpose behind such a proposal. Unless the whole gamut of costs such as

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[1]"Financial Management in the Department of Defense," The Federal Accountant, VII (March, 1958), p. 49.

military personnel, employee fringe benefits, insurance, interest, and taxes are included a "true" cost will not be determined anyway.

Reserve for Mobilization

One difficulty that has to be taken into consideration in applying a charge for depreciation to the customer has to do with the unutilized or under-utilized capacity. Naval shipyard capacity calculations are, and of necessity must be, determined on the basis of emergency conditions. This means that anything approaching full utilization of resources will be confined to actual time or war or to times of great imminence of war. All other degrees of emergency will be periods of fractional utilization. This reflects the fact that no peacetime naval shipyards are concerned with two types of "end-product": (1) production of materials and services, and (2) maintenance of industrial mobilization capacity. The costs of these two types of end-product should be budgeted and accounted for separately. Regulations Governing Industrial Fund Operations contains the following statement:

> The agency or command having management responsibility for an industrial fund activity shall budget and pay for the costs of maintaining unutilized or under-utilized plant and facilities. The retention of such facilities must be specifically approved by departmental headquarters as essential in support of mobilization readiness.[1]

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[1]Department of Defense Directive 7410.4. Subject, Regulations Governing Industrial Fund Operations, May 20, 1968, p. 4.

Failure to recognize idle capacity as such simply means that the overhead rate charged to production is too high. Yet, most naval shipyards find that separation becomes a very difficult problem and never fully resolve the issue. To overlay the already inflated overhead costs, therefore, with a charge for depreciation would make the idle capacity cost problem more acute by proportionately increasing the already significant error caused by failure to recognize excess capacity. This could have advantageous repercussions by forcing the separation of excess capacity and requiring the funding of such capacity through separate appropriation. This information would be of significant assistance to Congress and to the Secretary of Defense in making difficult decisions concerning proper levels at which to maintain industrial activities.

Control of Equipment Procurement

Many proposals for including depreciation in end-item costs seem to be grounded in the desirability of controlling equipment procurement locally, and in gaining greater freedom from the appropriation process. Thus, a comptroller writes:

> We are of the opinion that a more factual cost would be recorded if these depreciation costs were included in product costs. Furthermore, we think it would be highly desirable to establish reserves for depreciation, and to permit the commanding officer to make the decision as to the replacement of capital equipment or the acquisition of new equipment. At present, capital equipment requirements are the subject of separate financing and normally involve a considerable time lag. At Forest Park, we are in favor of granting the commanding officer more freedom in the management of

> his plant. This freedom would definitely be enhanced by the establishment of reserves from which capital equipment could be procured.[1]

The local procurement of equipment, in response to locally determined needs and subject to local authority, is frequently held to be a "business-like" way of conducting affairs. Writing of business practice, however, Joel Dean observed:

> Controls for capital expenditures need to be more comprehensive and based on more thorough analysis of individual projects and more far-sighted anticipation of the future than any other type of corporate control. This is so for several reasons.
>
> First, the responsibility for capital expenditures inevitably rests at the very highest pinnacle of management. Top management cannot delegate this responsibility to managers of autonomous divisions. Responsibility for capital expenditures is only partly in the hands of the president. In form and, to an important degree in substance also, it remains in the hands of the board of directors.
>
> Second, the stockholder is looking over management's shoulder; the stockholder has a more direct stake in decisions on capital projects than in most, for after all it is his money that is being spent. In these decisions, therefore, the trusteeship function of management comes clearly to the surface.
>
> Third, capital expenditure decisions are particularly intricate. They demand a high caliber of investigation, require many-sided judgment, and call for forecasts that reach far into the future.
>
> Fourth, capital expenditures are important. They provide a framework for the company's future by determining its scope, efficiency, capacity, and comparative power.[2]

In the area of long-term, high-dollar decisions which involve basic issues as to size, capability, and dispersion of the

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[1]Brogan, op cit., p. 15.

[2]Joel Dean, "Controls for Capital Expenditures," Modern Management of Capital Expenditures (American Management Association, Financial Management Series No. 105, 1953), pp. 3-4.

military industrial plant, and other broad policy matters, it is not at all clear that capital decisions could better be made locally than centrally.

On the basic issue of control, Assistant Secretary Garlock of the Air Force told a House Subcommittee that, as activities are financed through an industrial fund:

> . . . capital costs will not be recouped by service charges and it should not be. That is the main control that Congress retains over the size of all these activities because if you cannot replace it out of your revenues, you are required to be back here every year for determination by the Congress as to the size of the operation. We think that should remain that way and, therefore, we should not include in the charge to the receiving agency charges large enough to allow us to replace the capital items.[1]

The possibility of relinquishing too much control of capital expenditures to the industrial fund activity has been one of the main deterrents to the proposals that a charge for depreciation be included in the bills for materials and services to the activity's customers. The loss of too much control was a fear of Congress when the number of industrial funds themselves began to increase so rapidly. This point was expressed by Congressman Wigglesworth when, in speaking to Assistant Secretary of the Navy Franke, he observed that:

> The view has been expressed, as you no doubt appreciate, that the industrial fund and stock fund principle has been carried too far, that it is inadvisable, at least from the point of view

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[1]U.S., Congress, House, Subcommittee of the Committee on Appropriations, Hearings, Department of the Air Force Appropriations for 1957, 84th Cong., 2d sess., 1956, p. 1483.

> of the Congress, because it results in less control rather than more control over financial operations.[1]

Congressman Wigglesworth then asked if the Navy's working-capital fund operations would create " . . . greater control and greater economy." Mr. Franke replied:

> Yes sir; and I would like to add that I have never agreed with the statement that the use of industrial funds and stock funds deprived the Congress of control. In my own opinion, there is perhaps more control by Congress because we have industrial funds and stock funds. We prepare budgets of industrial funds the same as we prepare budgets anywhere in the Navy.

Budget controls for industrial funds operations differ in some respects from operations where appropriation subdivisions are cited directly as work is performed. However, budget controls do exist and it is possible to integrate industrial fund operations into the overall structure of budgetary control. Industrial funds are not something apart from the budget system and control by Congress does not have to be circumvented.

Any request for capital expenditure could be contained within the budget for approval through the normal budgetary process. This would be an absolute must up to and including the Department of Defense level because of the broader spectrum of review necessary and the necessity for expenditures to be in consonance with overall defense policies and plans. It is easy to suggest giving the shipyard commander

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[1]U.S., Congress, House, Subcommittee of the Committee on Appropriations, Hearings, Department of the Navy Appropriations for 1957, 84th Cong., 2d sess., 1956, pp. 61-62.

one piece of money and letting him manage within program guidance to be furnished, but he cannot be expected to have knowledge of the Navy's worldwide present and future needs for various types of ships, technology, strategy, etc., unless each shipyard commander equipped himself with a staff capable of providing such information. Since this information must be provided by higher authority, it would not be a difficult matter to present proposals for capital expenditures in the operating budget for subsequent approval. Control can be executed by approval or disapproval of the shipyard's operating budget by higher authority.

Another facet of control was suggested by an official of the Bureau of the Budget. In a recent interview by the author, the point was made that, if a reserve for replacement did in fact become a reality, the Bureau would take a close look at the exemption from apportionment which the industrial funds now enjoy.[1] This review would be for the purpose of possibly rescinding the exemption of that portion of the industrial fund designated as a replacement reserve. This could prove to be cumbersome and not really necessary. Only that amount of money necessary to procure equipment which is currently needed would be involved in a request for approval and to apportion that would be unrealistic.

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[1]The Director of the Bureau of the Budget is required by law to apportion appropriations and funds although he may, at his discretion, exempt certain accounts (including working-capital funds) from such apportionment. At the request of the Department of Defense, industrial funds were exempt from apportionment by the Director in June, 1952.

Method and Base for Depreciation

What should be the basis for a depreciation calculation and the method? The Industrial Activities Working Group stated that "for industrial establishments the straight line method based on historical cost is believed to be adequate since this method and base are still by far the most commonly used in private industry practice."[1]

There are those, however, who hold the view that the real object of a sound depreciation policy is the correct measurement of cost, in order that there may be recovered each year a sufficient number of current dollars to equal that year's capital consumption in terms of original dollars. This group would state that under a "historical cost" basis the costs are understated and capital is consumed without recovery. Insufficient depreciation charges, therefore, tend toward the dissipation of capital. This, in turn, may make it difficult to finance those replacements of plant and machinery that are necessary to maintain productive efficiency. There is a consequent difficulty to modernize.

Depreciation viewed in this light has been referred to as economic depreciation or price-level depreciation. There are those who go so far as to say that "the cost-principle of depreciation is a Socialist State principle, and it results in the dissipation of capital in a manner that

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[1]Industrial Activities Working Group, op cit., p. 34.

can be used to destroy the private capital system which maintains our system of living."[1]

While this analysis is probably somewhat extreme, it is worth observing that the price-level adjustment of depreciation does maintain the capital that was originally invested at its current price-level value. In an industrial fund activity, this would mean the recovery of more cash[2] for eventual replacement purposes while at the same time stating costs in current dollars. Since revenues are stated in current dollars this would approach the proper matching of costs and revenues. Hence, both the revenue and revenue deductions would be expressed in homogeneous dollars.

On what basis, then, should a price-level adjustment be made? The employment of index numbers to adjust for changes offers the best prospect for a simple and practical solution. There are a number of indices available such as the consumer price index and various construction or equipment cost indices. Since no specific index has been developed for this purpose,

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[1]Leonard Spacek, "Inflation in Business," A speech before the Cincinnati Control of the Controllers Institute of America, September 10, 1957.

[2]The Industrial Activities Working Group made the following comment concerning the use of the term "cash": Some heat has been generated about the propriety of the use of the term "cash" in industrial fund accounting. This seems to be a very minor detail. The present arrangement is that the United States Treasurer acts as the "banker," and that every disbursing officer is well aware of the amount of his authority to spend against his treasury balance. Whether this is to be called "cash," "treasury balance," "authority to spend," or "liquid claim upon society's productive capacity" is a low order semantic problem. (Industrial Activities Working Group, p. 50.)

the important consideration would be that all naval shipyards utilize the same index. The application of these index numbers does not require any complicated accounting or mathematical computation.

It is not the purpose of this paper to argue the relative advantages or disadvantages of the historical cost-principle and price-level depreciation. In either instance, a reserve for capital replacements could be established and a big step toward maintaining an up-to-date plant will have been taken. The Bureau of Engraving and Printing is a good example of this fact. They also use the revolving fund concept and include depreciation charges on equipment as part of the sectional overhead costs in rendering bills to their customers. In a pamphlet published by the Bureau of Engraving and Printing, the following paragraph is included:

> The Bureau's program for planning and accomplishing improvements in facilities and technology was given added impetus when it was authorized to use the working capital fund method of operations and the related business-type techniques and procedures for budgeting and financing capital replacements and improvements. Under the former annual appropriation systems funds were available only for obligations incurred during the fiscal year for which appropriated. Uncertainty as to what funds would be available for total planned acquisitions had the effect of impairing the long-range planning, designing and developmental work necessary to efficiently develop or procure highly specialized equipment.[1]

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[1]The Department of the Treasury, Synopsis of Financial Management in the Bureau of Engraving and Printing, May, 1968, p. 14.

In a telephone conversation with the Chief of Financial Management at the Bureau of Engraving and Printing, the author learned that the historical cost principle is used in computing depreciation. While this is better than no depreciation at all, the Bureau of Engraving and Printing has had to ask Congress for an increase in the amount of their working capital on several occasions. An example was cited whereby a piece of machinery was purchased in 1965 for $300,000 and today that same piece of machinery has increased in price by almost 42 per cent.

Allowing for Profit

The point is well taken that a reserve for depreciation probably will not be sufficient to cover the cost of replacing capital equipment. Increases in technology alone will create a gap between that amount recovered and the amount necessary for procurement. In the world of business, the additional funds required for replacement over and above those provided by depreciation provisions represent investment of new capital that may come from profits, loans, or other sources.

The manager of a shipyard does not have these alternatives available. New capital must be appropriated by Congress and he is forbidden from making a profit in his operation. At least two sources have spoken out in favor of allowing a profit within established parameters. The Industrial Activities Working Group, in expressing their preference for a fixed price said:

> At best, the setting of fixed prices would almost certainly bring about a net profit or net loss. A net profit would be interpreted by the customers as proof that prices had been too high, and raise the question as to whether: (a) a refund is in order, (b) the establishment would be obligated to turn the profits in to the treasury as miscellaneous receipts, or (c) the establishment would be allowed to keep the profits as an expansion of its capital.
>
> The third possibility seems to be favored, with the possible provision of upper limits. It has been suggested that allowable profits be set at one per cent of the first $1,000,000 of volume, and one-half of one per cent on higher volumes. Some such limited profits rule would keep the customers from feeling gouged, provide a modest reserve for losses in less successful periods, and would, in a long period of successful operation, provide small amounts of additional working capital under the control of the local management.
>
> Whether the particular limits suggested are the most desirable or not, the principle involved seems sound.[1]

Another proponent of profit in naval shipyards is John Haldi, who wrote that " . . . yards which show a 'profit' should be allowed to keep and apply some amount of it towards capital improvements. The amount retained might be something like 20 per cent of all profits earned but not exceeding a maximum of one per cent of total sales."[2]

Bureau of Census Plan

A unique proposal for using the amounts collected for depreciation for financing an equipment replacement program was

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[1]The Industrial Activities Working Group, op cit., p. 50.

[2]John Haldi, Unpublished Article entitled, "Internal Markets as a Means to Greater Efficiency in the Defense Department," September 20, 1963.

suggested by the Bureau of the Census.[1] Their plan contemplated that the annual salaries and expenses appropriation made to the Bureau would be used to initially finance all replacement equipment purchases and that appropriation would subsequently be reimbursed from other appropriations on the basis of depreciation of equipment actually used in performing work for the activities that are financed by these appropriations. In other words, one appropriation would be charged when other appropriations are properly chargeable and a later adjustment of funds would be necessary to record the charges to the proper appropriation.

This type of scheme is similar to an alternative mentioned earlier[2] and would require legislative authority inasmuch as Section 1210 of the General Appropriations Act, 1951, 64 Stat. 765, provides that "no funds made available by this or any other act shall be withdrawn from one appropriation account for credit to another, or to a working fund, except as authorized by law." Inasmuch as legislative authority would undoubtedly prove difficult to achieve for a proposal of this nature, it would be unwise to pursue this alternative as a solution to the naval shipyards' problems. This proposal is indicative of the fact, however, that alternatives are available.

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[1]Department of Commerce, Assistant Secretary of Commerce for Administration, letter of May 28, 1958.

[2]See above, p. 42.

A Feasible Alternative

A more feasible alternative, perhaps, would be to utilize the funds available to the shipyard commander in the form of the Navy Industrial Fund to procure replacement equipment. This would be in the nature of a loan from the Treasury since revolving funds deposited in the Treasury are not represented as a "pool of money" but only represent the authority to draw on the Treasury. The shipyard could procure the necessary equipment within certain guidelines or parameters and within the constraints of the revolving fund and "repay" the fund through a charge for depreciation on the bills rendered to the customers.

The precedent has been set by the Bureau of Engraving and Printing which follows a similar procedure.[1] In the budget document they identify long-range planning as it relates to capital expenditure. This does not constitute a request for appropriation. If no one questions the proposed acquisitions through the series of hearings which must take place, their approval is assumed and the acquisition is accomplished.

This could be a workable procedure for the naval shipyards and the problem of how and when to begin could be answered by capitalizing the current equipment and including it as an asset of the industrial fund. Present regulations do not cover this important point except to say that " . . . plant and equipment shall not be included as assets of the

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[1]Interview with Chief, Office of Financial Management, Bureau of Engraving and Printing, March 16, 1970.

industrial fund, except as specifically authorized by the Assistant Secretary of Defense (Comptroller). However, memorandum accounts will be established in the industrial fund general ledger for such assets and the related reserve for depreciation."[1]

Improvements are Economical

There are solid economic reasons why naval shipyards must be allowed to improve the state of the art at their various activities. Increased productivity at less cost has been the overriding advantage of a flexible and realistic equipment modernization schedule. Experience at the Bureau of Engraving and Printing can attest to this fact.[2] From 1951 through 1967, the average annual salaries and wages of their employees increased by 94 per cent and the average cost of material increased approximately 25 per cent. In addition, they assumed additional annual costs of over $5 million which were not covered in their expenditures prior to the institution of the revolving fund.[3] These included such things as the guard force, the disbursing function, employee health and insurance program and the civil service retirement fund. In spite of these significant increases, the technological improvements introduced during the same period have resulted

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[1]Department of Defense Directive 7410.4, op cit., p. 8.

[2]The following information is based on data contained in Synopsis of Financial Management in the Bureau of Engraving and Printing.

[3]The Bureau of Engraving and Printing started conducting its business under the revolving fund concept in 1951.

in an annual recurring savings of some $18.5 million. The benefits achieved through the technological improvement program for currency, for example, are reflected in the fact that the unit cost rate per thousand notes has been reduced from $9.92 in Fiscal Year 1951 to $8.14 in Fiscal Year 1967. This happened in the face of spiraling increases in labor and materials.

Some tests which have been conducted at various naval shipyards also attest to the wisdom of keeping capital equipment modern and efficient. Exhibits 4-1 and 4-2 are two examples of these tests. Aside from a considerable annual savings in dollars, there is a significant reduction in the number of man hours required. This could result in a faster job by fewer men with the consequence of returning ships-of-the-line to the operating forces in a more expeditious manner. Fewer ships would possibly be required to perform the same tasks as are now being performed. The skill level of those men required could be raised, however, to a point where it could cause some nagging recruitment problems.

These exhibits represent only one piece of equipment each, but when expanded to cover the entire range of production equipment, their impact could be considerably more impressive. In a briefing before a Congressional subcommittee on military appropriations, a Navy Captain provided the following testimony:

> One of the major improvements is represented by the eighty-three numerically controlled tools currently

> on hand or under order. These tools will replace 228 standard machine tools and amortize their cost in 2.2 years.[1]

To cite an example given at the same briefing, one numerically controlled machine costing $150,000 will replace four conventional machines with a total cost of $173,000. The total cost to the Navy for the eighty-three numerically controlled tools mentioned above is $11,066,600 and the annual savings derived are $5,083,300.[2]

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[1] Military Construction Hearings, 1969, op cit., p. 557.

[2] Ibid., p. 557.

ANALYSIS OF THE WIEDEMANN
A-30 N/C TURRET PUNCH VS.
CONVENTIONAL MACHINERY

Annual	Conventional	A-30	Annual Savings	Productivity Increase Ratio
Labor Costs	10,000 MH	6,000 MH	4,000 MH x $7.37/hr.= $29,480	1.67
Material Handling Costs	6,800 MH	3,400 MH	3,400 MH x $7.37/hr. = $25,058	2.00
Setup Costs (Job Analysis, Layout, Programming for A-30)	13,400 MH	10,600 MH	2,800 MH x $7.37/hr. = $20,636	1.26
Total (Annual)	30,200 MH	20,000 MH	10,200 MH x $7.37/hr. = $75,174	1.51

Source: Long Beach Naval Shipyard, Standards Branch, "Numerically Controlled Piercing Machinery: Findings, Analysis, Recommendations."

EXHIBIT 4-1

	CONVENTIONAL	N/C	SAVINGS
Direct Labor Hrs.	6--Engine Lathes	1-N/C Lathe	--
Loaded Annually:	20,000 Hrs.	6,670 Hrs.	13,330 Hrs.
Labor: $7.36/hr.	$147,200	$49,090	$98,110
Plus: N/C Programming	-0-	$15,476	($15,476)
Total	$147,200	$64,566	$82,634
	Cost Ratio:	$147,200/$64,566 =	2.28

EXPERIENCE AT MARE ISLAND DIVISION:
20" AMERICAN TAPE CONTROLLED LATHE
(N/C) VS. CONVENTIONAL MACHINERY

EXHIBIT 4-2

CHAPTER 5

CONCLUSION

The United States shipbuilding industry is made up of two main segments -- naval shipyards and private shipyards. These activities build and maintain the largest mobile man-made product in the world. Both of these segments have played important roles in helping the United States to maintain a strong and viable position as one of the world's great sea powers, and also retain an acceptable mobilization base. Many factions have sought to eliminate or sharply curtail the role the naval shipyards play in this respect. Many of the arguments used against the naval shipyards contain a certain degree of bias and emotion. These arguments, nevertheless, have undoubtedly brought pressures to bear on the nation's policy makers which ultimately resulted in the closing of several of the naval shipyards. Perhaps this was the wise and prudent thing to do at the time.

All government activities need to be frequently questioned by members of the business community as well as special committees and subcommittees and members of the public at large in order to remain alert and attentive to their public trust. The arguments posed by the antagonists of the naval shipyards have, in the long run, been helpful to the

improvement of those shipyards. They have prompted the Navy to conduct many investigations into the effectiveness and efficiency of the industrial activities. As a result of one of the recent investigations, it was concluded that the naval shipyards are no longer capable of optimum efficiency.

There are many reasons why this situation has developed. Some of them have to do with the physical condition of the shipyard plant. The equipment and facilities of the existing naval shipyard complex are oriented primarily toward the wartime requirements of the 1940's. Individual facilities in some yards have been upgraded, however, on a piecemeal basis to meet specific needs. Most of the shipyard's production equipment was purchased prior to 1944 and its average age is approaching a quarter of a century.[1]

Other reasons are in connection with workflow patterns and adequate space. The space required for weapons systems repair work, for example, on a modern guided missile destroyer is five times that required by a World War II destroyer. In addition, naval shipyards have "evolved" their present layout and workflow by having made additions as required to the physical plants. These additions were frequently made on a piecemeal basis and sited wherever sufficient space could be found. Optimum material and work flow necessary for efficient operations was obstructed and the naval shipyards were forced into the rigid mold of an existing layout.

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[1]Ginn, op cit., p. 12.

Still other reasons for the existence of less than efficiently managed and operated shipyards revolve around an ever increasing technology. The maintenance of highly sophisticated combatant warfare systems is a much more complex problem than that presented by the ships of the World War II era. These problems require better, more technologically advanced machinery and equipment. It has been concluded that the solution to the current problems involves a massive modernization program with large doses of money. The Naval Ship Systems Command has launched such a program to last for ten years and to bring the naval shipyards to an acceptable level of modernization.

A primary deterrent to efficient operations throughout the Federal Government was the lack of sound budgeting and accounting practices. The Federal accounting system prior to the middle of the century was not capable of providing effective tools for proper management. Largely as a result of the Hoover Commission Report, the National Security Act Amendments of 1949 were passed by Congress to promote economy and efficiency within the Department of Defense by providing effective management tools. Such a tool was the Navy Industrial Fund. The Navy Industrial Fund is primarily an accounting device to provide for the financing of operations at Navy installations of the industrial or commercial-type from a single fund rather than from a great number of funds as was the case under the traditional appropriations financing system. The Navy Industrial Fund, and its subdivisions into project funds for the

individual installations, are revolving funds in which working capital is retained intact. Once the corpus is established, payments for the costs of manufacturing goods or providing services are made from the fund and reimbursement from other appropriations is obtained in payment for goods and services to replenish the fund and keep it intact. All reimbursement is at cost and no profit results.

The Navy Industrial Fund provides a more effective means for cost control over operations and promotes a greater sense of responsibility, or cost-consciousness, in customers of the industrial fund activity. Shipyard customers are appropriated a fixed amount of funds to be applied toward ship repair and overhaul and can buy from the shipyard as long as the money lasts and then must stop. They are, therefore, interested in making their money go as far as possible. This provision also acts as a means of control. As a matter of fact, a major purpose of Title IV was to strengthen central review and control, and to make it more meaningful. With respect to working-capital funds, the Title states:

> No greater cost shall be incurred by the requisitioning agency for stores, supplies, materials, or equipment drawn from inventories, and for services rendered or work performed by the industrial-type or commercial-type activities for which working-capital funds are authorized by this section, than the amounts of appropriations or funds available for such purposes.[1]

Reports of both the House and Senate Armed Services Committees on the legislation make clear that this provision was intended

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[1] 5 U.S. Code 172d (f).

to secure control of industrial-fund operations by permitting industrial-fund installations to undertake work only after a customer organization had placed an obligation against its appropriation. At one point, both Committees refer to the working-capital concept as " . . . the means by which the Congress continues to control the amount of money that may be spent . . . "[1]

Yet, one of the basic principles underlying the installation of the Navy Industrial Fund was to give increased flexibility of operation without the restrictions frequently forced on operations by appropriation accounting. This has been one of its major benefits and the results have been increased economy and efficiency of the industrial and commercial-type activities of the Navy. Managers are now able to gather important data concerning the cost of doing business which was not possible under the former system.

It has also been claimed that the Navy Industrial Fund system allowed for more comparability of costs between industrial fund activities themselves and with costs in private industry. This point is of questionable value, however, since there are a number of excluded costs in the Navy Industrial Fund which are currently recorded only as "statistical costs" and thus tend to distort comparability. The exclusion of

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[1]U.S., Congress, Senate, Committee on Armed Services, National Security Act Amendments of 1949 (Senate Report No. 366, 81st Cong., 1st sess., May 12, 1949), p. 18. U.S., Congress, House, Committee on Armed Services, Reorganizing Fiscal Management in the National Military Establishment (House Report No. 1064, 81st Cong., 1st sess., July 14, 1949), p. 8.

certain costs from the prices of goods and services together with the fact that profits are shunned causes the Navy Industrial Fund to lose some of its similarities to the procedures utilized by private industry. There is little point, however, in debating whether a given military operation is or is not a business. The issue is not the grand alternative of running a shipyard, for instance, like a business, but that of finding practical arrangements to meet practical problems -- techniques for measurement, allocation, and control. Certain business techniques are promising in these endeavors, not because they are business techniques, but because they appear to be the best way of meeting practical problems.

One of the excluded costs is depreciation of equipment. Although Public Law 87-651 expressed Congressional intent to have working-capital funds reimbursed for "cost of using equipment,"[1] the Department of Defense has not yet seen fit to implement this intent. In 1966, as a matter of fact, the Assistant Secretary of Defense (Comptroller) stated that under the Department of Defense's concept of resources management, the long range goal is "to charge 100 per cent of measurable expenses."[2]

Depreciation on equipment is definitely an element of cost and is measurable. The inclusion of this element in

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[1]See above, p. 32.

[2]Address of Assistant Secretary of Defense (Comptroller), Robert N. Anthony, Defense Management Systems Course, Naval Postgraduate School, Monterey, California, August 5, 1966, p. 3.

prices for work performed by the naval shipyards, and for which the Navy Industrial Fund is reimbursed, would result in a reserve within the industrial fund. This reserve could then be made available for financing replacement of equipment for which replacement was deemed necessary. This concept, it seems, has far more merit and promise than the procedure which is now being followed. That procedure is one of requesting funds far in advance and not really knowing the outcome of the request for two to two and one-half years after. Not only that, but the actual appropriation frequently differs considerably from the amount requested and on occasion the request is denied altogether. Availability of funds is quite unpredictable. These factors make it extremely difficult for the shipyard commander to plan and maintain a modernization schedule. In order to accomplish assigned workloads, he is forced to expend funds for maintenance of existing equipment which often is beyond economical repair. Timely replacement of outmoded, obsolete equipment would eliminate many high operating and maintenance costs and a long run operating gain could result from increased productivity of a modern plant with modern equipment and the reduction of direct labor and maintenance personnel. This flexibility is denied the shipyard commander under the current procedure.

In considering depreciation expense for work performed, care must be taken to make a reasonable and practical distinction between production equipment not in use (excess capacity) and equipment which is in use (current capacity). The

industrial fund is not intended to finance the cost of maintaining excess plant and equipment. This is to be accomplished by means of a separate appropriation and any part of excess capacity charged against a customer's order raises the price of the end-product and tends to aggravate and distort the decision-making process concerning the amount of and location of excess capacity required. Moreover, the exclusion of this factor from the pricing of the end-product would help to relieve whatever pressures might be brought to bear by the argument that a charge for depreciation would inevitably increase the cost to the customer for work performed.

If a depreciation charge is assessed and reimbursement is applied to a reserve for replacement, the amount collected would be largely dependent upon the method and base for depreciating the equipment. An adjustment in the depreciation to reflect current price-level of the equipment involved would more nearly approach a "truer" cost and would recover a greater amount of funds to be used for replacement of equipment.

The amount of funds recovered under this scheme would probably fall short of the amount required for replacement. This deficit should be realized and allowance should be made for the accumulation of a regulated "profit." This profit would fluctuate within prescribed parameters in accordance with funds required to finance proposed capital expenditures. When forecasted capital expenditures were small and the reserve for replacement was adequate, the degree of profit would be negligible or even non-existent. It is conceivable that there

would be periods wherein losses were deliberately incurred in order to avoid the accumulation of funds beyond anticipated need.

It does not follow, however, that funds so collected would be utilized by shipyards unconditionally. The funding of equipment and the authority to replace equipment are separate problems and can be viewed as independent of one another. The Barker Committee[1] stated that such recoveries used as a source of financing for new machinery and equipment should be "subject to appropriate safeguards such as approval by higher authority." Control over usage of a depreciation reserve can be facilitated through use of such techniques as cash forecasts and operating budgets. The matter of control need not deter the institution of procedures which could be beneficial to all parties concerned.

Although the proposal to charge depreciation as an element of cost and include a factor for "profit" so that a reserve for replacement could be created does have merit, its adoption by Congress and its ready acceptance by the shipyard customers would be difficult to achieve. The very mention of the word profit would cause an uproar of protest. In all fairness, it must be said that the possibility of abuse, either wittingly or not, is greater under this proposal.

The alternative which would require the least adjustment, and which already has a precedent in the Bureau of

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[1]See above, p. 39.

Engraving and Printing, is one which would involve a "loan" from the Treasury. This could be accomplished by increasing the amount of the industrial fund through capitalization of the equipment now held by the shipyards. This increase in the industrial fund could then be used to purchase new equipment when required. The new equipment would be depreciated over its useful life and a charge made against the customer for such depreciation. Each time a customer reimbursed the industrial fund an installment on the loan would be repaid.

The only obstacle to such a proposal is the lack of proper legislation regarding capitalization of equipment. This legislation should be sought. Naval shipyards should be allowed to manage their capital equipment within the context of the industrial fund. Authority for the expenditure can be requested through regular budgetary channels without having to acquire an appropriation. Congress would not be so reticent about granting authority as it would about appropriating funds.

There are many advantages to be derived from a more flexible capital replacement program. The timely and judicious replacement of equipment would lessen the economic impact of spending huge sums of money on an "all-out" modernization program by spreading these costs over the useful life of the equipment and by replacing equipment on a staggered schedule. The shipyard commander would be better able to plan and maintain realistic equipment modernization schedules because he would have a greater degree of certainty as to the amount and timeliness of funds available for his equipment requirements.

Costly interrupted production caused by administrative delays in acquiring appropriations for necessary capital equipment could be avoided and a continuity of operations could be achieved.

It is clear that some action must be taken. To continue in the same way would be to reject the lessons that experience has so painfully taught. It would be unwise to allow our nation's naval shipyards to sink to the level at which we now find them after going through the time and expense of raising them to an acceptable level. The advantages to be accrued through the proposed alternatives are worthy of sincere consideration. Sound economic principle demands it.

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